

REDESCRIPTION OF THE LARVA OF *ODONTACARUS (LEOGONIUS) BARRINENSIS*
(WOMERSLEY) (ACARINA: TROMBICULIDAE: LEEUWENHOEKIINAE)

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The larva of *Odontacarus (Leogonius) barrinensis* (Womersley, 1945) is redescribed, the lectotype and paralectotypes are designated, and the new data are compared with those of the original description. Womersley's measurements were too large (mean error = 3.53%). Analysis of the metric data confirms the separation of *O. (L.) barrinensis* from its taxonomically nearest species, *O. (L.) athertonensis* (Womersley, 1945).

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The genus *Odontacarus* Ewing, 1929 (Acarina: Trombiculidae: Leeuwenhoekiiinae) is known mainly as larvae in the Australia-New Guinea region; all of these are placed in the subgenus *Leogonius* Vercammen-Grandjean, 1968 (see Southcott 1986a).

The first Australian species recognized was *O. australiensis* (Hirst, 1925), a widespread species occurring from eastern Australia to New Guinea (Hirst 1925; Womersley 1944, 1945; Domrow 1956; Goff 1979a). Womersley (1944) described five more species as larvae (as *Leeuwenhoekia* Oudemans, 1911): *O. adelaideae*, *O. hirsti*, *O. mccullochi*, *O. novaguinea* and *O. southcotti*, and (1945) four more as larvae: *O. athertonensis*, *O. barrinensis*, *O. echidnus* and *O. longipes* (as *Acomatacarus* Ewing, 1942).

Further species (as larvae) have been added by Southcott (1957, 1986a, b) and Goff (1979a, b). The most recent general treatments of the taxonomy of these larvae have been by Southcott (1986a, b, 1989). Of the species known as larvae, deutonymphs have been described by Womersley (1945) of *O. longipes* and *O. novaguinea*, by Domrow (1956) of *O. australiensis*, and by Southcott (1989) of *O. adelaideae*. Based on larval characters, Domrow (1956) synonymized *O. hirsti* with *O. australiensis*, and Goff (1979a) synonymized *O. longipes* with *O. novaguinea*.

Womersley (1944, 1945) relied heavily on statistical characters for his species differentiations. Difficulties in separating some of these species led Veitch and Southcott (1984) to make a study of some species referred to *O. athertonensis*, or from the Atherton Tableland, Queensland. This showed good statistical differentiating characters for *O. athertonensis* (Womersley, 1945), *O. mccullochi* (Womersley, 1944), *O. 'species S'* (now *O. swani* Southcott, 1986a), and an unnamed species (now *O. veitchi* Southcott, 1986b) from Mt Jukes, Queensland.

One species requiring redescription was *O. (L.) barrinensis* (Womersley, 1945), which Womersley placed close to *O. athertonensis*.

In the present paper the larva of *O. (L.) barrinensis* is redescribed from the type series, and its taxonomic status evaluated.

MATERIALS AND METHODS

Slide-mounted mites in the South Australian Museum, Adelaide (SAM) referred to *O. Barrinensis* were examined. The five syntypes (ACB188A-E) were all in gum chloral media, on individual slides, mounted by me on 17.xi.1943 and again on 7.v.1944, but apparently not remounted subsequently. Specimen ACB210A (N19896) showed evidence of remounting, and the mount was largely opaque and unusable. All these slides also bore a SAM number of ARA7524. No further remountings have been done.

Microscopy and drawing techniques, also terminology and abbreviations, are as in Southcott (1989). All measurements are in micrometres (μm) unless otherwise specified.

Odontacarus Ewing

Odontacarus Ewing, 1929, p. 188.

(For other synonymy see Southcott, 1986a, p. 171, and contained references).

Definition of larva as in Southcott, 1989, p. 37. Type species: *Trombicula dentata* Ewing, 1925, p. 257.

Subgenus *Leogonius* Vercammen-Grandjean, 1968.

Definition of larva as in Goff, 1979a, p. 143.

Type species: *Leeuwenhoekia australiensis* Hirst, 1925, p. 150.

Odontacarus barrinensis (Womersley)
Figs 1A-D, 2

Acomatacarus barrinensis Womersley, 1945, p. 106.
For other synonymy see Southcott, 1986a, p. 188.

Description of larva: Lectotype

Colour in life red. Length of idiosoma (mounted on slide) 245, width 200; total length from tip of

cheliceral fangs to posterior pole of idiosoma 335.

Dorsal scutum wider than long (nasus included); nasus well developed, blunt pointed, slightly waisted, meeting body of scutum at approximately right angles; anterior border (omitting nasus) slightly concave, anterolateral borders convex, posterolateral borders almost straight, anterolateral and posterolateral angles rounded, posterior pole rounded, forming an obtuse angle. Scutalae narrow,

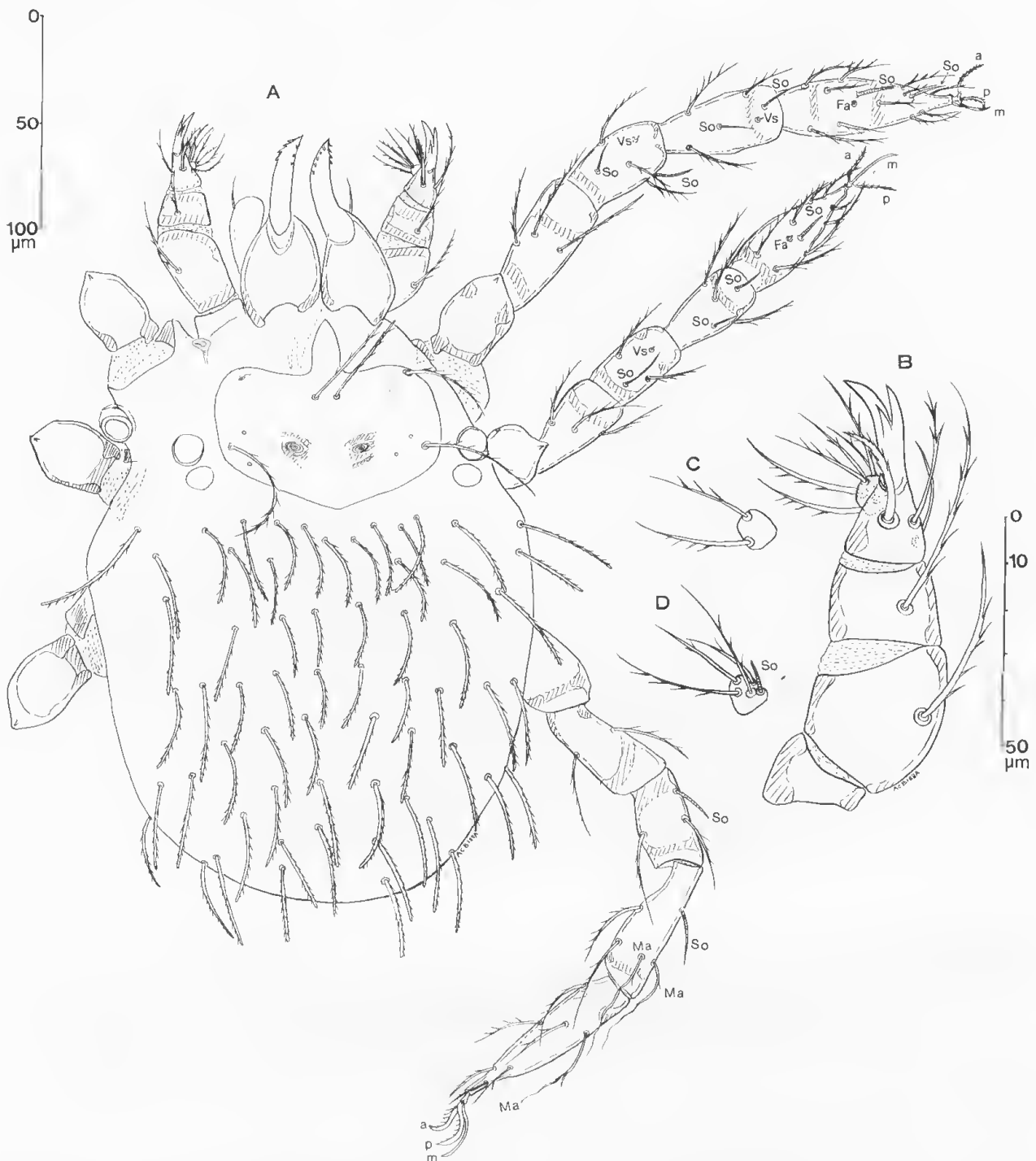


FIGURE 1. *Odontacarus barrinensis* (Womersley), larva, lectotype. A — Dorsal view, legs on left omitted beyond trochanters. B — Right palp, dorsal. C — Palpal tarsus, dorsal. D — Palpal tarsus, ventral. To standard symbols. (Each figure to nearer scale).

tapering, slightly blunted at tip, with moderately outstanding acute setules. Sensilla level with PL scutala bases; sensillary setae missing in all specimens. Scutum finely porose, with two larger pores (lacunae) near each PL scutala base.

Metric data as in Table 1.

Eyes oval, posterolateral to dorsal scutum, anterior with maximum diameter I6, posterior with maximum diameter I3.

Dorsal idiosomalae similar to scutalae, arranged: humerals 2, then approximately I8, 6, I0, 11, 9, 3, 2; total *ca* 61.

Ventral surface of idiosoma with a pair of setulose, pointed setae, bases 36 apart, between coxae III, 3I long. Behind coxae III opisthosoma with *ca* 46 setae, 28 pre-anal, 18 post-anal, pointed, setulose, 22–45 long, increasing in size posteriorad, and there resembling PDS. Anus oval, 2I long by 6 wide (valves apposed). Urstigma well chitinized, oval, 20 by 18, set in concavity in coxa I. Coxalae 2, I, 1, well setulose, tapering, pointed; lateral coxala I 60 long, medial coxala I missing, all specimens, coxala II 44–46 long (paratypes), coxala III *ca* 42 long (paratypes).

TABLE 1. Metric data for *Odontacarus (Leogonius) barrinensis* (Womersley) larvae, type series.

Character	N19891 (ACB188A) Lectotype	n	Observed range	mean	s.d.	Coefficient of variation (%)
AW	73	5	68–73	69.6	2.07	2.98
PW	86	5	80–86	83.6	2.61	3.12
SB	31	5	26–31	28.0	2.00	7.14
ASB	55	5	52–55	54.0	1.41	2.62
PSB	27	5	26–28	27.0	1.00	3.70
L	82	5	78–83	81.0	1.87	2.31
LA	21	5	16–21	18.2	1.92	10.57
LB	61	5	61–64	62.8	1.30	2.08
LN	32	5	29–32	30.8	1.64	5.33
W	101	5	95–101	98.2	2.28	2.32
AP	31	5	27–32	30.0	1.87	6.24
AM	39	5	35–39	37.6	1.67	4.45
AL	46	5	40–46	43.2	2.68	6.21
PL	57	4	57–59	58.3	0.957	1.64
PL/AL	1.24	4	1.23–1.40	1.28	0.0818	6.40
AMB	11	5	11–12	11.4	0.548	4.80
Sens	–	0	–	–	–	–
PW/LB	1.41	5	1.28–1.41	1.33	0.0515	3.87
DS	33–60	5	57–64*	60.4*	2.70*	4.47*
Hum**	60	5	57–64	60.4	2.70	4.47
MDS	33–36	5	33–36*	35.0*	1.41*	4.04*
PDS	41–46	5	43–46*	45.2*	1.30*	2.88*
Gel	48	5	46–48	46.8	1.10	2.34
Til	56	4	55–56	55.8	0.500	0.897
TaI(L)	80	5	79–89	84.4	4.62	5.47
TaI(H)	26	5	24–26	25.4	0.894	3.52
GeI	39	5	39–43	41.2	1.64	3.99
TiI	45	5	45–49	47.0	1.87	3.98
TaII(L)	66	5	66–72	70.2	2.68	3.82
TaII(H)	24	5	22–24	22.8	0.837	3.67
GeII	47	5	46–48	47.0	0.707	1.50
TiII	66	5	60–66	62.0	2.35	3.78
TaIII(L)	90	5	88–91	89.8	1.30	1.45
TaIII(H)	22	5	20–22	21.0	1.00	4.76
AW/AP	2.35	5	2.13–2.56	2.33	0.156	6.69
AW/TiIII	1.11	5	1.10–1.15	1.12	0.0241	2.14
PW/TiIII	1.30	5	1.30–1.41	1.35	0.0455	3.38
PSB/SB	0.87	5	0.87–1.08	0.968	0.0746	7.71
PW/AP	2.77	5	2.63–2.96	2.79	0.127	4.56

*For maximum values

**Humeral seta length

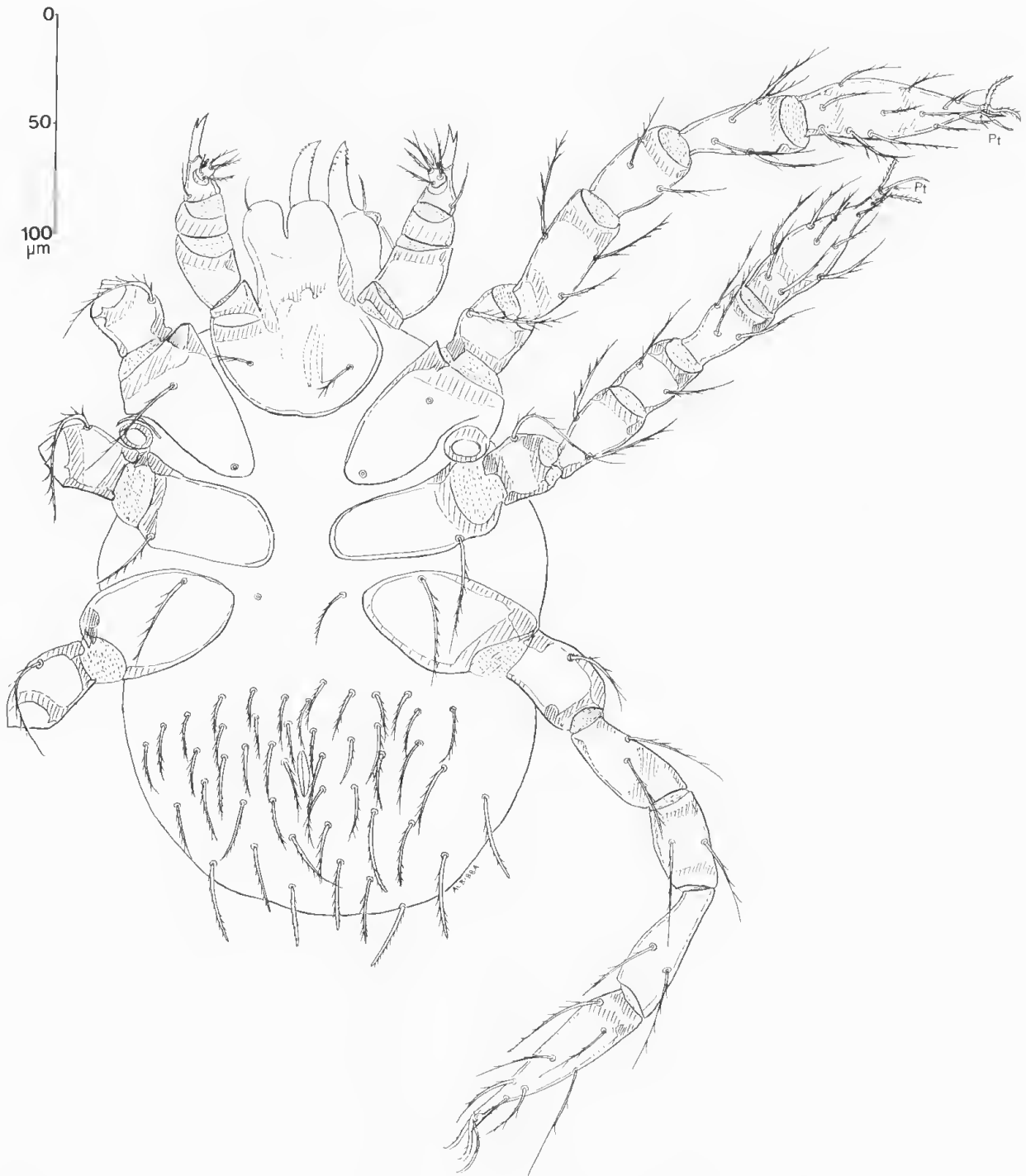


FIGURE 2. *Odontacarus barrinensis* (Womersley), larva, lectotype, ventral view, legs on left omitted beyond trochanters. Pt — pretarsala. (Some setae completed from paratypes).

Dorsal tracheal opening normal, between lateral border of palpal coxa and anterior border of coxa I.

Legs: lengths (including coxae and claws) I 370, II 330, III 390. Scobalar formula: trochanters I, I, I, femora 6, 5, 4, genua 5, 4, 4, tibiae 7, 6, 6 (including 2 mastalae on III), tarsi 24, 17, 14 (including one mastala on III).

Leg specialized setae as follows (lengths in parentheses): SoGeI.30d(14), SoGeI.64p(21), VsGeI.65d(2), SoTiI.49d(16), VsTiI.77pd(3), SoTiI.89d(17) (*i.e.* distal to VsTiI). SoGeII.20d(18), VsGeII.60d(*cal*), SoTiII.40d(12), SoTiII.86d(14). SoGeIII.23d(26), SoTiIII.37d(24).

Tarsus I with SoTaI.49d(19), FaTaI.42pd(ca2).
Tarsus II with SoTaII.54d(14), FaTaII.47d(ca2).

Pretarsal formula 1, 1, 0. Tarsal claws normal; neomedian the longest, thinnest; anterior and posterior claws with double fringes of small onychotrichs.

Gnathosoma normal; combined chelicera bases 68 across; length 89 from tip of cheliceral fangs to posterior margin chelicera bases. Fangs stout, curved, with 3–4 stout dorsal teeth and 4–5 smaller ventral teeth. Galeala simple, pointed, 22 long. Gnathobasal setae (palpal coxal setae) (from paratype ACB188C) slender, well setulose, 18 long, with four or five setules.

Material examined

Queensland: Lake Barrine, 16.xi.1943, R. V. Southcott, five larvae, N19891–19895 (ACB188A–E). *O. barrinensis* was based on 'five syn-types collected free, from Lake Barrine, Queensland, 16 Nov. 1943 (R.V.S.), and a single specimen from man, Atherton Tableland, Queensland, 8 March 1944 (R.V.S.)'. Southcott (*loc. cit.*) clarified collection details of these specimens. Specimen N19891 (ACB188A) is hereby specified as lectotype, specimens N19892–19895 (ACB188B–E respectively) paralectotypes.

The lectotype is labelled: R. H. label (in writing of R.V.S.): LECTOTYPE; (in writing of H. Womersley) *Acomatacarus barrinensis* n. sp./ Co-type/ Lake Barrine/ Q. 16.11.43/R.V.S./ L. H. Label (in writing of R.V.S.) ACB188A/ Running over log./ Shores of Lake Barrine/ Q. 16-11-1943/ R. V. Southcott. On reverse of slide, in unidentified writing: ARA7524/ Trombiculidae/ *Odontacarus/ barrinensis/* syntype.

Specimen N19896 (ACB210A) was unidentifiable (see above), and is excluded.

Remarks

The measurements given in Table 1 differ from those of Womersley (1945) for the same series of five mites. A comparison of Womersley's figures (means) for the same characters as used here shows that his measurements are higher than those given here. These eight percentage increases have a range of 0.67–6.38%, with a mean of 3.53 and a standard deviation of 1.86.

Successive efforts have been made to find differentiating characters for the larval *Odontacarus* of northern Queensland and Papua-New Guinea (Womersley 1944, 1945; Southcott 1957, 1986a, b, 1989; Goff 1979a, b, 1981; Veitch and Southcott 1984). Womersley's material has been only partly restudied, so that his differentiating characters as published had perforce to be utilized in my keys (1986a: 179; 1989: 42). Prominent among Womersley's criteria were the number of dorsal and ventral idiosomal setae, the ratio PW/LB (as 'PW/SD'), and the absolute sizes of the shield characters, as well as the length of DS. Clarification of the taxonomy of several species — *O. australiensis*, *O. novaguinea* and *O. hirsti* — was by Domrow and Goff. Veitch and Southcott (1984) and Southcott (1986a) provided adequate differentiating characters for *O. athertonensis*, *O. mccullochi*, *O. swani* and *O. veitchi*. The inconsistent errors in Womersley's measurements made the use of his key hazardous. Two species still needing differentiation were *O. athertonensis* and *O. barrinensis*, which had been collected from two sites on the Atherton Tableland, separated by about 22 km.

Womersley (1945: 106) stated of *O. barrinensis*: 'This species is very close to *athertonensis* in the number of dorsal setae, ca 64 in each. It differs, however, in the Standard Data, the values for AW, PW and SB being very significantly different.'

TABLE 2. Differentiating characters of the type series of *Odontacarus barrinensis* and *O. athertonensis* larvae.

Character	<i>O. barrinensis</i>					<i>O. athertonensis</i> *				
	Lectotype	n	mean	s.d.	Observed range	Lectotype	n	mean	s.d.	Observed range
AW	73	5	69.6	2.07	68–73	71	21	65.9	2.70	61–71
PW	86	5	83.6	2.61	80–86	80	21	77.62	2.66	75–87
SB	31	5	28.0	2.00	26–31	25	21	25.10	1.41	22–30
PL/AL	1.24	4	1.28	0.0818	1.23–1.40	1.34	20	1.36	0.0805	1.20–1.57
PW/LB**	1.41	5	1.33	0.0515	1.28–1.41	1.21	21	1.25	0.0756	1.17–1.45
AW/AP	2.35	5	2.33	0.156	2.13–2.56	2.84	21	2.34	0.201	2.06–2.84
AW/TiIII	1.11	5	1.12	0.0241	1.10–1.15	1.09	21	1.10	0.0491	1.00–1.23
PW/TiIII	1.30	5	1.35	0.0455	1.30–1.41	1.23	21	1.30	0.0691	1.17–1.53
PSB/SB	0.87	5	0.968	0.0746	0.87–1.08	1.40	21	1.16	0.124	0.93–1.40
PW/AP	2.77	5	2.79	0.127	2.63–2.96	3.20	21	2.76	0.222	2.38–3.22

*From Southcott (1986a), plus new data

**PW/SD of Womersley (1945)

In Table 2 a comparison is given of metric characters of the type series of *O. barrinensis* and *O. athertonensis*. These are the principal characters used in keys to larvae. Table 2 shows that there is a considerable overlap of all the listed characters of the two species, and in fact the ranges of values for *O. barrinensis* lie entirely within those of *O. athertonensis*, for all characters except AW, SB and PSB/SB.

Table 3 shows a comparison of the means of the characters listed in Table 2, by t-test, on the usual assumption that the variances do not differ. Table 3 shows that there are significant differences between the 'size factors' AW, PW and SB. It shows also that there are significant differences in the 'shape factors', the proportions PW/LB and PSB/SB, and borderline significance for PL/AL. Comparison of the two type series has not revealed other morphological differences.

Even though exclusive separating characters between *O. athertonensis* and *O. barrinensis* larvae have not been found, the metric differences for scutal size and shape indicate that the separation is justified.

The life history of this species will be described in a succeeding paper.

TABLE 3. Comparison of means of key characters separating *O. barrinensis* and *O. athertonensis*, by t-test.

Character	t	d.f.	P and significance
AW	2.197	24	0.05 > P > 0.02*
PW	4.536	24	< 0.001***
SB	3.637	24	0.01 > P > 0.001**
PL/AL	1.856	22	0.1 > P > 0.05, n.s.
PW/LB	2.281	24	0.05 > P > 0.02*
AW/AP	0.1633	24	0.9 > P > 0.8, n.s.
AW/TiIII	0.9471	24	0.4 > P > 0.3, n.s.
PW/TiIII	1.495	24	0.2 > P > 0.1, n.s.
PSB/SB	3.205	24	0.01 > P > 0.001**
PW/AP	0.288	24	0.8 > P > 0.7, n.s.

*Significant at the 0.05 level of probability

**Significant at the 0.01 level of probability

***Significant at the 0.001 level of probability

n.s. not significant.

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A NEW MIDDLE TERTIARY CROCODILE FROM LAKE PALANKARINNA, SOUTH AUSTRALIA

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Summary

Australosuchus clarkae is a new generalised Oligo-Miocene crocodylian from Lake Palankarina, South Australia. It appears to be part of a recently recognised endemic Tertiary radiation of crocodiles in Australia.